

### **Audiology Can't Wait**

What's the important message about audiology I want you to take home today? Audiology can't wait. Regardless of the child's age, the audiologist can administer a hearing test to detect hearing loss early. Whenever a hearing loss is suspected, refer the child to a pediatric audiologist or pediatric audiology center as soon as possible.

# Amplification Systems

- Hearing aids:
  - Analog
  - Programmable
  - Digital
- Cochlear implant systems



## Amplification Systems

I'd like to talk in more detail about two types of hearing technology systems: hearing aids and cochlear implants.

When hearing loss cannot be corrected through medical or surgical treatment, it is necessary to begin amplification management, specifically the fitting of hearing aids, as quickly as possible.

The goal of any amplification system is to make speech and environmental sounds loud enough while avoiding high sound-intensity levels that may pose a risk to residual hearing. Fitting hearing aids in infants and young children poses certain challenges, specifically the physical limitations posed by a small ear and the inability of the infant to communicate subjective information. Nevertheless, even young infants can be fitted with hearing aids using estimates of hearing sensitivity derived from electrophysiologic hearing testing, such as auditory brain stem response (ABR) or the newer auditory steady-state response (ASSR). Once the child is developmentally mature enough to participate in behavioral hearing tests, the hearing aid can be modified and fine tuned to more closely match the child's hearing loss.

## When You Suspect a Hearing Loss

### What should you do?

- Immediately refer to pediatric audiologist for more thorough testing. If diagnosed:
  - Fit with hearing aids ASAP
  - Begin habilitative intervention to ensure technological efficacy
- Encourage parents to enjoy their children while they help them learn to listen and talk



### When You Suspect a Hearing Loss

Taking immediate action when you suspect a hearing loss is important because every day missed is a day that language acquisition is affected.

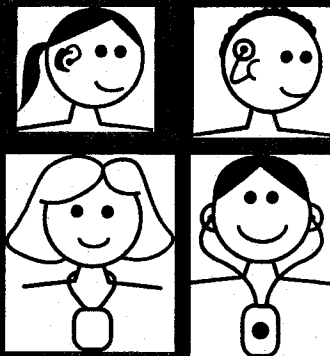
As soon as a screening indicates a problem or you suspect a problem, refer the child to a pediatric audiologist for a complete evaluation. The audiologist's pediatric experience is essential, because testing children and infants is very different from testing adults who are losing their hearing. It also requires special training.

When hearing loss is identified, a medical work-up, usually performed by a pediatric otolaryngologist, should be done to determine the cause and possible treatment options.

Hearing aids can and should be prescribed and fitted as soon as the hearing loss is diagnosed. It takes time to fit a child properly and get well-fitting earmolds, so sooner is better. Hearing aids alone are not a quick fix, however. Parents and professionals need to work closely with children to help them make sense of sound.

Parents also need time to learn about deafness and the options that exist for communication. Some hearing parents need a longer period of time than others to make adjustments in their parenting style. The sooner the hearing loss is identified, the more time they have to do that.

# Hearing Technology Today



**Dramatically improved in the past 10 years**

- Powerful, flexible options
  - Hearing aids
  - FM (individual) amplification systems
  - Infrared (group) amplification systems
  - Cochlear implants



## Hearing Technology Today

Let's move on now and discuss the dramatically improved hearing technology that is available today. The technology available to children who are deaf and hard of hearing has improved significantly in the past 10 years and continues to become more powerful and sophisticated.

Even children with profound deafness can now benefit from hearing aids, whereas 20 or 30 years ago, the available aids and earmold technology were insufficient to provide appropriate amplification. In addition, today's hearing aids can be more finely tuned to the child's specific hearing profile.

The range of options for different children and different situations includes hearing aids, FM (personal) amplification systems, infrared (group) amplification systems, and cochlear implants, each of which I'll review in greater detail.

# IMPACT OF EARLY IDENTIFICATION AND INTERVENTION OF DEAF AND HARD-OF-HEARING INFANTS:

- Early Identification of hearing loss followed by immediate and appropriate intervention can now be defined as prior to six months of age.
- The benefits of early identification and intervention (prior to 6 months) can be demonstrated by twelve months of age through seven years of age.
- Children who are early identified and receive intervention prior to six months of age have significantly better receptive language, expressive language, personal-social skills, receptive vocabulary, expressive vocabulary and speech production.
- Late-identified children, whose hearing losses were identified between 7-12 months, 13-18 months, 19-24 months and 25-30 months, have similar language developmental profiles which are *not* significantly different from one another.
- Late-identified children have developmental language quotients which remain at fifty to sixty percent of their chronological age throughout their early childhood period.
- Language development of children who are early-identified with early intervention does *not differ by degree of hearing loss*, from mild through profound.
- Children with hearing loss only and those with secondary disabilities benefit from early identification and intervention.

From: Christine Yoshinaga-Itano, Ph.D. Amer. Assoc. For Home-Based Early Interventionists News Exchange

## Fitting Young Children



### Fitting Young Children

Fitting children with hearing aids is not a once-and-done event. It requires time and patience.

Since prelingual patients cannot talk, observation and deduction is required. The audiologist's observations at the child's appointments are important, but time-limited. Thus, it is important to rely upon the parents' ability to notice and discuss the child's response to the hearing aid. Encourage parents to take notes and bring them to appointments.

Parents may need to experience several different types of hearing aids over time in order to find the one that works best for their child. A daily, weekly, and monthly maintenance routine is important to ensure that young children are getting the benefit of the aid. Batteries go bad, peanut butter gets in the microphone, cords break, etc. At any given time, only half of small children's aids are working properly.

Children may find hearing aids intrusive or try to take them out at first. Parents may feel awkward about handling the aid or may even have feelings of embarrassment that their child needs a hearing aid. With practice, guidance, and patience, parents will see their child greatly benefiting from proper use of the hearing aid.

## Early Diagnosis is Important

- Enables early intervention to take place
- Takes advantage of the critical window for language acquisition
- Gives parents more time to make decisions



### **Early Diagnosis is Important**

Early diagnosis can dramatically alter outcomes in children with hearing loss. The sooner a child's hearing loss is diagnosed, the sooner the child can be fitted with hearing aids and enrolled in an early intervention program. This enables professionals to take advantage of that critical window for language acquisition and also gives parents more time to make decisions about the type of educational program in which to enroll their child.

## When Diagnosis is Delayed

### Undiagnosed deafness can lead to impaired language development<sup>1</sup>

- First 6 months of life are critical for language development<sup>2</sup>

1. Sininger YS, Doyle KJ. The case for early identification of hearing loss in children. *Ped Clin N Amer.* February 1999;1-14.
2. Yoshinaga-Itano C, et al. Language of early- and later-identified children with hearing loss. *Pediatrics.* 1998;102:1161-1171.



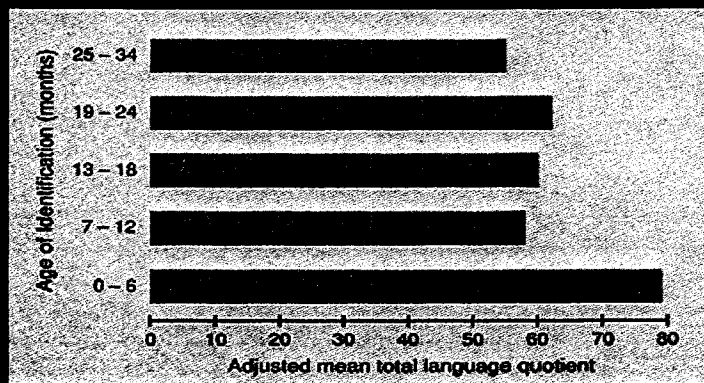
### When Diagnosis is Delayed

Another perhaps even greater concern among parents and professionals is that undiagnosed deafness can lead to impaired language development.<sup>1</sup> We know that the most critical stage of language development occurs before 6 months of age.<sup>2</sup> The absence of sound during this period can permanently impair a child's ability to process sound, especially language.<sup>1</sup>

1. Sininger YS, Doyle KJ. The case of early identification of hearing loss in children. *Ped Clin N Amer.* February 1999;1-14.
2. Yoshinaga-Itano C, et al. Language of early- and later-identified children with hearing loss. *Pediatrics.* 1998;102:1161-1171.



## The Case for Early Diagnosis and Intervention



Source: Yoshinaga-Itano C, et al. Language of early- and later-identified children with hearing loss. *Pediatrics*. 1998;102:1161-1171.



### The Case for Early Diagnosis and Intervention

Let's take a look at one landmark study that confirmed the value of early intervention.

To determine whether early intervention for children with hearing loss made a difference in language development, Yoshinaga-Itano and colleagues from the University of Colorado compared the receptive and expressive language abilities in children with hearing impairment with those of children with no hearing loss. Study participants had hearing loss ranging from mild to profound.

The study found that scores were significantly higher when the children were diagnosed and intervention started before 6 months of age.

You can see from the results that children whose hearing loss was identified between 0 to 6 months achieved higher language scores than those who were identified later.

**NOTE TO PRESENTER:** You may want to modify this portion of the core presentation by adding slides from the supplemental "Early Hearing Detection and Intervention Programs" module included on the CD-ROM.